



# **MAINTENANCE MANAGEMENT MANUAL**

## **SUMMARY**

### **PREFACE**

**This Maintenance Management Operations Manual has been prepared by the County Road Administration Board for the counties of Washington State. The Manual is intended to support implementation and operation of a formal Maintenance Management System (MMS) and is intended for use by the individuals with responsibility for the development, implementation and operation of a county's Maintenance Management System. The general maintenance management concepts described in this manual are applicable to all counties. Specific details of maintenance management, however, may vary from county to county due to varying conditions and needs.**

**The summary below provides an overview of Maintenance Management and some guidance in “getting started” towards setting up and preparing to use more formal maintenance management procedures. Specific examples shown in this summary include some of the information necessary for the building blocks of an effective management system.**

USING THE MANUAL—This manual can be used in a number of ways, including:

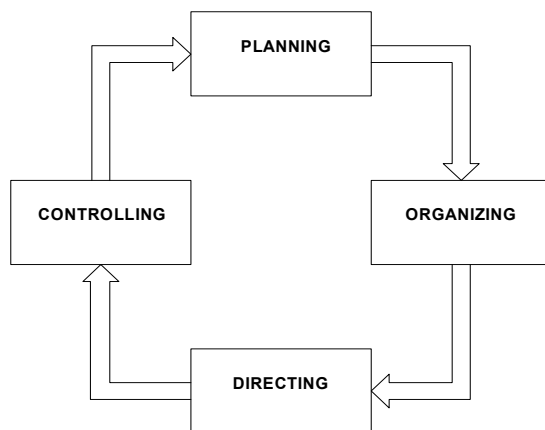
1. As an overview of Maintenance Management
2. As a guide to setting up a Maintenance Management System
3. As a step-by-step explanation of Maintenance Management
4. As a guide for field operations
5. As a guide for management
6. As an indicator of computer requirements
7. As a procedures manual for MMS operation and update
8. As a training guide
9. As a view of the organizational attributes of Maintenance Management

Overview of maintenance management....from general to specific.....

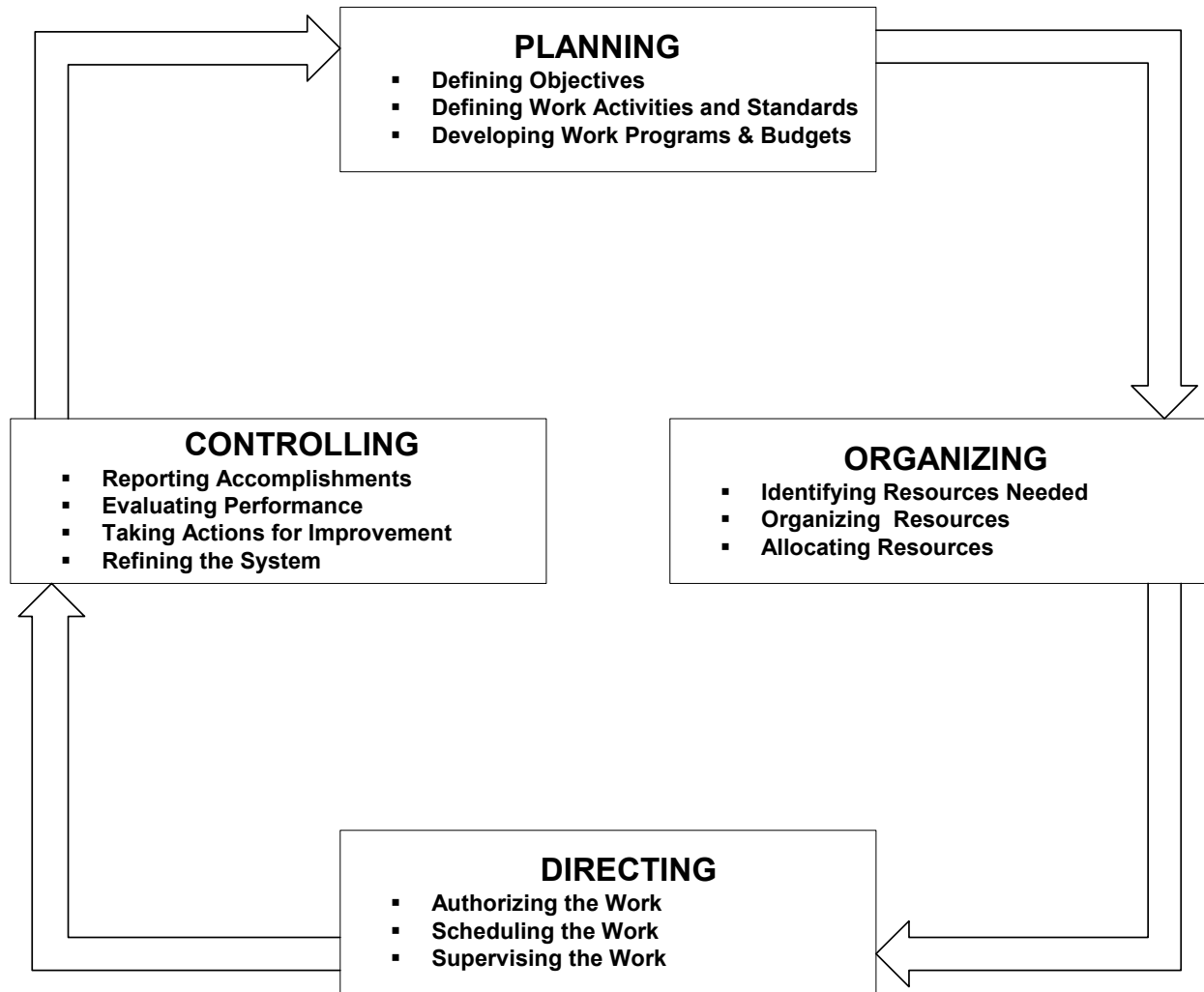
Maintenance management is a method of utilizing resources to accomplish a predetermined level of service for road assets. Formal maintenance management includes the primary management functions of planning, organizing, directing and controlling. A maintenance management system (MMS) can be described as a systematic process to manage a maintenance program. Another way of describing maintenance management—a systematic work management process that applies good common sense to help people work together to improve maintenance operations.

Starting from this brief description of maintenance management, the paragraphs and figures below provide additional, and increasingly detailed, descriptions of maintenance management procedures and elements of maintenance management systems.

Applying management principles to county road maintenance operations recognizes that many county road activities can be planned, scheduled and accomplished in a defined manner. Maintenance management provides a framework for developing maintenance plans, tracking work accomplishment and preparing reports that compare planned and actual performance. Beginning with a basic framework for management which includes planning, organizing, directing and controlling, an overview of maintenance management can be presented as:



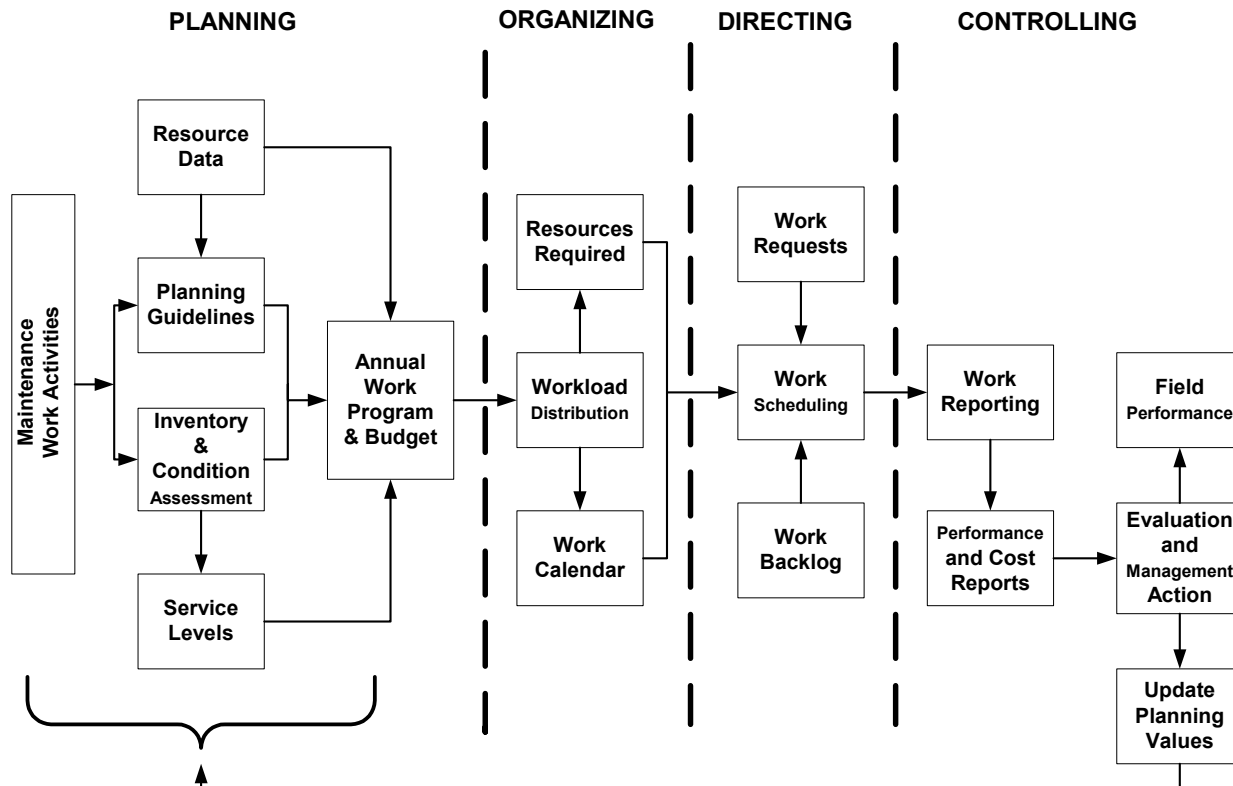
Including more descriptive, though still fairly general, details provides the following:



Further description of these elements of maintenance management could include the following:

- Planning maintenance activities based upon the road features to be maintained, the resources (labor, equipment & materials) needed to provide maintenance and the level of service to be provided by the maintenance. This includes preparing budgets based upon maintenance performance standards to define the specific types and amounts of maintenance work.
- Organizing the labor, equipment and material resources to ensure that planned maintenance activities can be accomplished with the budget available.
- Directing maintenance operations by authorizing, scheduling and supervising maintenance activities and preparing the annual, seasonal and short-term schedules needed for guidance.
- Controlling maintenance operations by monitoring work accomplishment and expenditures to ensure that planned work programs are actually achieved within available resource levels.

The flow of information throughout the maintenance management process provides another, yet more detailed, view of a formalized maintenance program:



The above information flow depicts the primary elements and sub-elements of a formalized maintenance management system (MMS). Maintenance management systems are used by public works directors and field managers to plan, organize, schedule, control and evaluate road maintenance programs. With maintenance responsibilities involving many miles of roads, many employees and often millions of dollars, the management requirements are complex and require consistent procedures to ensure the success of a maintenance program.

Essentially, maintenance management systems are orderly processes for recording, analyzing and displaying information about the road system, the work performed in maintaining the system and the resulting costs and condition of the system. For small operations, manual recording and analysis may be a suitable means of operating the system, though with availability of microcomputers, almost all agencies can benefit from the use of electronic data processing for management systems.

Regardless of the way in which the data is processed, the concepts of a maintenance management system remain the same. The basic components of maintenance management systems developed and generally accepted by road maintenance organizations include:

- The development of performance standards for principal maintenance activities describing the procedures to be followed, the labor, equipment and materials to be used and the rate of production to be achieved.
- The determination of workloads through the measurement of quantities of the various elements of the road system (system inventory) and the evaluation of external influences (such as weather and traffic) acting upon these elements which create a need for maintenance.
- The budgeting (dollars) of resources (labor, equipment, materials) to meet the predicted workload in terms of specific programs (activities, quantities, locations) to be achieved.

- The scheduling of activities within the budgeted program to utilize resources in the most efficient manner, to reduce fluctuations in manpower and equipment requirements, and to keep the roadway system operating in a safe, convenient manner.
- The establishment of a management information system which provides the basic knowledge required by operating managers for routine decisions and the special reports required by management for control and improvement of the program.

A fundamental element of a maintenance management system is timely reporting of pertinent, accurate data. This permits performance evaluations and management decisions to be based upon documented facts. The facts include information as to how effectively and economically the available resources were utilized by the field forces and how much work was done in comparison with the amount originally planned. Problem areas can then be identified and corrective action can be taken to ensure effective accomplishment of the work program.

In addition to the normal fiscal information provided by the county's accounting function, many public works agencies use systems that account for the cost of work, activity by activity. This "activity costing" does not replace line-item reporting of expenditures. It simply provides another basis for evaluating work being done. Such "activity costing" or "cost accounting" systems come in many forms, from custom tailored systems related to the county's general accounting system to customized "off-the-shelf" maintenance, work or resource management systems from a range of computer software vendors. The attributes of any such system employed by the county will influence the manner in which the above noted MMS information flow can be accommodated. Although cost accounting systems allow the detailed tracking of maintenance activity costs, such systems may not accommodate the details of the budget development process, workload distribution and the generation of work schedules that may be desired.

What can a formalized maintenance management system (MMS) do for a county? It can do what county engineers, maintenance managers and supervisors want it to do — no more, no less. The system is a management tool, one that can be employed to achieve a number of benefits or one that can be used to attain only certain limited objectives. Typical benefits are summarized below:

- *Improved Resource Utilization* — The maintenance management system helps county engineers use their labor, equipment, and materials more efficiently. For example, workload peaking can be reduced considerably, improving labor/productivity. Such efficiency improvements give the county better road maintenance for the same tax dollars. Alternatively, the county can reduce its maintenance expenditures while retaining the level of service it has enjoyed in the past.
- *Equitable Resource Allocation* — In the maintenance management system, expenditures in each area of the county are based on the road requirement in that particular area. Thus, expenditures in each area have an objective basis and all parts of the county have comparable levels of service.
- *Budget Evaluation* — In the maintenance management system, a proposed budget is derived from a work program that specifies exactly how the money will be used. If available funds are less than the amount needed, someone in authority must decide which maintenance services are to be reduced or eliminated. If the elected officials direct that additional services or higher levels of maintenance service be carried out, the cost can readily be determined. After a budget has been approved and the money spent, elected officials can compare the actual results with those in the approved work program.
- *Employee Morale* — Field supervisors and their crews like to know what is expected of them. The maintenance management system provides them with clear performance standards and timely information about their actual performance. Experience has shown that improved morale is particularly evident when supervisors participate in the development of performance standards and system procedures and in the actual reporting of daily work accomplishment.

....and some possible problems:

Even though the basic concepts and procedures for the maintenance management system are quite logical and simple, some managers encounter problems when they try to adapt and implement such systems. Some pitfalls and ways to avoid them are described below.

- *Insufficient Management Support*—Normally, the county engineer and his staff will be responsible for developing the details of the system. Elected officials, however, should be kept informed 1) of the system operation and 2) of the consequences associated with managing within the system approach. They must have a sincere commitment to the system objectives and procedures.
- *Over-refinement*—Some managers seek unrealistic precision in the system. Excessive numbers of defined work activities, application of sophisticated time and motion studies as a prerequisite for adopting work performance standards, and unduly complicated procedures for reporting and summarizing work performance all delay implementation and acceptance of the system. The fact that many maintenance agencies employ performance standards suggests that there is no need to “reinvent the wheel.” Nor is there any need for time-and-motion studies. Instead, there is need only to adapt and refine existing standards. A county can adopt standards that work for another county, revising them as experience is gained.
- *Lack of Adequate Orientation and Training*—Inadequate orientation and training of field personnel can cause problems and confusion during the initial periods of implementation. Do not expect operations and procedures to change automatically because a memo is issued or a manual of instructions is distributed. Special efforts are essential to bring about understanding and acceptance of new methods and procedures, such as a series of carefully planned workshops for supervisors. Advanced orientation and training will pay off with quicker and more effective results. Without such training, implementation will be painful at best, and perhaps even unsuccessful.
- *Labor Union Opposition*—A few special considerations can arise when maintenance forces are unionized. To alleviate the concern and skepticism of union workers regarding new techniques and procedures affecting their jobs, management must discuss the new system early in order to establish a mutual understanding and alleviate apprehension. Union support and endorsement of new systems and procedures generally occur when labor union representatives participate in discussions with management regarding the impacts of system implementation on union employees.

GETTING STARTED—In setting up and preparing to use more formal maintenance management procedures, details of the planning element should be addressed. Specifically, the important building blocks of maintenance management—activity guidelines and feature inventory should be addressed. Note that the PLANNING and other elements of maintenance management address following questions:

What kinds of information are needed to set up a maintenance management system?

- Management unit data
- Maintenance feature inventory data
- Labor, equipment and materials cost and inventory data
- Maintenance activity information
- Location information

What are the specific procedures and questions addressed by maintenance management?

- How is the maintenance operation organized? (management units—districts, areas)
- What is maintained and what condition is it in? (feature inventory and condition assessment)
- What type of maintenance work is done? (activity list)
- How often or how much maintenance work should be done? (quantity standard and service level)
- What people, equipment and materials are needed? (resources and costs)
- When is work done? (work calendar)
- When, where, why, and how is the maintenance activity performed? (activity guideline)
- Where is work done? (location)
- What is the optimum level of maintenance? (desired work program and budget)
- What level of maintenance is funded? (planned work program)
- What is the difference between the desired and planned programs? (deferred maintenance)
- How much work is actually accomplished or requested? (work reporting)
- How does the planned work program compare to actual work accomplished? (evaluation reports)

## ***Documenting your maintenance work program***

***To begin, obtain and compile details of the current maintenance program:***

- ***Organization chart***
- ***Map—useful in identifying maintenance areas....and responsibilities***
- ***Current expenditures....BARS provides detailed tracking of maintenance costs***

***Document inventory of maintainable features  
(maintenance assets)....***

***What gets maintained?***

***A sample form for use in compiling such data is presented below. Note—the inventory may also be broken down by maintenance area to better document the maintenance feature inventory (assets) being maintained in each Supervisor’s area.***

**MAINTENANCE FEATURE INVENTORY DATA**  
**COUNTY ROAD ADMINISTRATION BOARD**  
**Maintenance Management Program**

| FEATURE<br>CODE | FEATURE<br>NAME | MEAS<br>UNITS | MGMT<br>UNIT | TOTAL<br>INVENTORY | CONDITION RATING |   |   |
|-----------------|-----------------|---------------|--------------|--------------------|------------------|---|---|
|                 |                 |               |              |                    | 1                | 2 | 3 |
| 2310            | gravel road     | miles         | ADAM         | 1,131              | 0                | 0 | 0 |
| 2320            | paved road      | miles         | ADAM         | 648                | 0                | 0 | 0 |
| 2330            | shoulder        | miles         | ADAM         | 1,296              | 0                | 0 | 0 |
| 2340            | total road      | miles         | ADAM         | 1,779              | 0                | 0 | 0 |
| 2410            | ditch           | miles         | ADAM         | 1,296              | 0                | 0 | 0 |
| 2420            | culvert         | each          | ADAM         | 2,669              | 0                | 0 | 0 |
| 2430            | catch basin     | each          | ADAM         | 1                  | 0                | 0 | 0 |
| 2510            | bridge          | each          | ADAM         | 124                | 0                | 0 | 0 |
| 2520            | other structure | each          | ADAM         | 124                | 0                | 0 | 0 |
| 2610            | sidewalk        | feet          | ADAM         | 1                  | 0                | 0 | 0 |
| 2620            | path            | feet          | ADAM         | 1                  | 0                | 0 | 0 |
| 2630            | street light    | each          | ADAM         | 1                  | 0                | 0 | 0 |
| 2640            | signs           | each          | ADAM         | 45,000             | 0                | 0 | 0 |
| 2650            | guardrail       | feet          | ADAM         | 3,240              | 0                | 0 | 0 |
| 2660            | striping        | miles         | ADAM         | 1,944              | 0                | 0 | 0 |
| 2910            | year            | year          | ADAM         | 1                  | 0                | 0 | 0 |

***Document unit costs and amounts of Labor, Equipment and Materials resources.***

***Such records are typically available from personnel/payroll files and ER&R files.***

***A sample form is presented below.***

**LABOR, EQUIPMENT AND MATERIALS DATA**  
**COUNTY ROAD ADMINISTRATION BOARD**  
**Maintenance Management Program**

**SAMPLE LABOR, EQUIPMENT AND MATERIALS RESOURCES AND UNIT COSTS**

| RESOURCE CODE | RESOURCE NAME   | MGMT UNIT | RES. TYPE | UNIT COST | INVENTOR Y | AVAILABILITY (PCT) or UNIT |
|---------------|-----------------|-----------|-----------|-----------|------------|----------------------------|
| E101          | Grader          | MTCE      | E         | 28.00     | 1          | 80                         |
| E102          | Pickup          | MTCE      | E         | 4.00      | 1          | 80                         |
| E103          | Dump truck      | MTCE      | E         | 21.00     | 1          | 80                         |
| E105          | Water truck     | MTCE      | E         | 15.00     | 1          | 80                         |
| E106          | Loader          | MTCE      | E         | 30.00     | 1          | 80                         |
| E107          | Patch truck     | MTCE      | E         | 10.00     | 1          | 80                         |
| E108          | Air compressor  | MTCE      | E         | 6.00      | 1          | 80                         |
| E109          | Distributor     | MTCE      | E         | 60.00     | 1          | 80                         |
| E110          | Steel Roller    | MTCE      | E         | 20.00     | 1          | 80                         |
| E111          | Plate compactor | MTCE      | E         | 3.00      | 1          | 80                         |
| E112          | Broom           | MTCE      | E         | 35.00     | 1          | 80                         |
| E113          | Rub tire roller | MTCE      | E         | 20.00     | 1          | 80                         |
| E114          | Excavator       | MTCE      | E         | 45.00     | 1          | 80                         |
| E115          | Vactor          | MTCE      | E         | 45.00     | 1          | 80                         |
| E116          | Chipper         | MTCE      | E         | 25.00     | 1          | 80                         |
| E117          | Chainsaw        | MTCE      | E         | 3.00      | 1          | 80                         |
| E118          | Propane torch   | MTCE      | E         | 2.00      | 1          | 80                         |
| L201          | Maint Worker I  | MTCE      | L         | 20.00     | 1          | 90                         |
| L202          | Maint Worker II | MTCE      | L         | 22.36     | 1          | 90                         |
| L203          | Maint WorkerIII | MTCE      | L         | 28.64     | 1          | 90                         |
| L206          | Sign Tech       | MTCE      | L         | 28.64     | 1          | 90                         |
| L209          | Supervisor      | MTCE      | L         | 30.00     | 1          | 90                         |
| M301          | 5/8" crush rock | MTCE      | M         | 12.00     |            | CY                         |
| M302          | Cold Mix        | MTCE      | M         | 40.00     |            | Ton                        |
| M303          | Crack filler    | MTCE      | M         | 2.00      |            | Gal                        |
| M304          | Sand            | MTCE      | M         | 9.00      |            | CY                         |
| M305          | Tack oil        | MTCE      | M         | 0.80      |            | Gal                        |
| M306          | Hot Mix Class G | MTCE      | M         | 35.00     |            | Ton                        |
| M307          | CRS2 or CMS2    | MTCE      | M         | 0.10      |            | Gal                        |
| M308          | Culvert         | MTCE      | M         | 12.00     |            | Ft                         |
| M309          | De-icer chem    | MTCE      | M         | 1.00      |            | Gal                        |
| M311          | Markers         | MTCE      | M         | 0.10      |            | Ea                         |
| M321          | Spray chemical  | MTCE      | M         | 12.00     |            | Gal                        |
| M331          | Trash bags      | MTCE      | M         | 0.50      |            | Ea                         |
| M391          | Misc materials  | MTCE      | M         | 1.00      |            | \$                         |
| M392          | Misc sign matrl | MTCE      | M         | 1.00      |            | \$                         |

***Develop, with Supervisors, complete descriptions of maintenance activities... the what, where, when, why, how and how much of maintenance activities....including cost also.***

***The Activity Guidelines below provide some suggestions and possible starting points for the discussion of maintenance activities. Note—this requires considerable attention and time as it is one of the most important steps in documenting the specifics of an individual maintenance program.***

Activity Guidelines show details of maintenance activities and also include resource cost information. Shown below is an example of a Maintenance Activity Guideline....the first page presents a format for documenting the activity and the second form (on the next page) presents a format for identifying and documenting costs associated with the activity, as well as expected average daily production.

|                              |       | WASHINGTON COUNTIES<br>Maintenance Management<br>MAINTENANCE ACTIVITY PLANNING GUIDELINE |     |     |     |                               |     |      |     |       |     |     |     |
|------------------------------|-------|--|-----|-----|-----|-------------------------------|-----|------|-----|-------|-----|-----|-----|
|                              |       | ACTIVITY NAME:   |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       | ACTIVITY CODE:   |     |     |     |                               |     |      |     |       |     |     |     |
| ACTIVITY DESCRIPTION:        |       |  |     |     |     |                               |     |      |     |       |     |     |     |
| MONTHLY SCHEDULE             |       | JAN  | FEB | MAR | APR | MAY                           | JUN | JUL  | AUG | SEP   | OCT | NOV | DEC |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
| SCHEDULING CONSIDERATIONS:   |       |  |     |     |     |                               |     |      |     |       |     |     |     |
| PERSONNEL                    |       |  |     |     |     | WORK CONSIDERATIONS           |     |      |     |       |     |     |     |
| CODE                         | CLASS | QTY  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
| EQUIPMENT                    |       |  |     |     |     |                               |     |      |     |       |     |     |     |
| CODE                         | CLASS | QTY  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     | REFERENCE AND SAFETY          |     |      |     |       |     |     |     |
| MATERIALS                    |       |  |     |     |     |                               |     |      |     |       |     |     |     |
| CODE                         | CLASS | QTY  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
| AVERAGE DAILY ACCOMPLISHMENT |       |  |     |     |     | MAINTENANCE FEATURE INVENTORY |     |      |     |       |     |     |     |
| QUANTITY                     |       | WORK UNIT  |     |     |     | FEATURE                       |     | UNIT |     | CODE  |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
|                              |       |  |     |     |     |                               |     |      |     |       |     |     |     |
| PLANNING GUIDELINE APPROVAL  |       |  |     |     |     |                               |     |      |     |       |     |     |     |
| BY:                          |       |  |     |     |     | EFFECTIVE DATE:               |     |      |     | PREV: |     |     |     |

Activity cost form.....

| WASHINGTON COUNTIES<br>Maintenance Management<br>ACTIVITY COSTING -- STANDARD DAILY COSTS |       |     |           |             |  |         |  |              |  |
|---|-------|-----|-----------|-------------|--|---------|--|--------------|--|
| ACTIVITY NAME:  |       |     |           |             |  |         |  |              |  |
| ACTIVITY CODE:  |       |     |           |             |  |         |  |              |  |
| MEASUREMENT UNIT:   |       |     |           |             |  |         |  |              |  |
| <b>PERSONNEL/CREW COSTS</b>   |       |     |           |             |  |         |  |              |  |
| CODE  | CLASS | QTY | HOURS     | HOURLY RATE |  | COST    |  | % TOTAL COST |  |
|   |       |     |           |             |  |         |  |              |  |
|   |       |     |           |             |  |         |  |              |  |
|   |       |     |           |             |  |         |  |              |  |
|   |       |     |           |             |  |         |  |              |  |
|   |       |     |           |             |  |         |  |              |  |
|   |       |     |           |             |  |         |  |              |  |
| <b>CREW TOTAL</b>   |       | 0   | 0         |             |  | 0.00    |  | #####        |  |
| <b>EQUIPMENT</b>  |       |     |           |             |  |         |  |              |  |
| CODE  | CLASS | QTY | HOURS     | HOURLY RATE |  | COST    |  | % TOTAL COST |  |
|   |       |     |           |             |  |         |  |              |  |
|   |       |     |           |             |  |         |  |              |  |
|   |       |     |           |             |  |         |  |              |  |
|   |       |     |           |             |  |         |  |              |  |
|   |       |     |           |             |  |         |  |              |  |
|   |       |     |           |             |  |         |  |              |  |
| <b>EQUIPMENT TOTAL</b>  |       | 0   | 0         |             |  | 0.00    |  | #####        |  |
| <b>MATERIALS</b>  |       |     |           |             |  |         |  |              |  |
| CODE  | CLASS | QTY | UNIT COST |             |  | COST    |  | % TOTAL COST |  |
|   |       |     |           |             |  |         |  |              |  |
|   |       |     |           |             |  |         |  |              |  |
|   |       |     |           |             |  |         |  |              |  |
| <b>MATERIALS TOTAL</b>  |       | 0   | 0         |             |  | 0.00    |  | #####        |  |
| <b>CONTRACT SERVICES</b>  |       |     |           |             |  | 0.00    |  | #####        |  |
| <b>SUMMARY:</b>   |       |     |           |             |  |         |  |              |  |
| <b>TOTAL DAILY COST</b>   |       |     |           |             |  | 0.00    |  |              |  |
| <b>AVERAGE DAILY ACCOMPLISHMENT</b>   |       |     |           |             |  |         |  |              |  |
| <b>UNIT COST (\$/UNIT)</b>  |       |     |           |             |  | #DIV/0! |  |              |  |

***By combining the material developed from the previous steps, a Work Program and Budget can be developed. This is one of the primary outputs of the PLANNING element of maintenance management.***

***See sample below. This sample was developed using the activity guidelines and cost data, as well as county's maintenance cost data for the year 2001 obtained from the annual report to the Secretary of Transportation.***

**WORK PROGRAM AND BUDGET REPORT**  
**COUNTY ROAD ADMINISTRATION BOARD**  
**Maintenance Management Program**

| CODE              | ACTIVITY NAME        | INVENTORY QTY UNIT | PLANNED SERVICE LEVEL QTY UNIT | PCT OF DES | ANNUAL WORK QTY | AVG DAILY PROD | CREW SIZE | PERSON DAYS | COST LABOR | DISTRIBUTION EQUIP | MAT/OTH | TOTAL COST |
|-------------------|----------------------|--------------------|--------------------------------|------------|-----------------|----------------|-----------|-------------|------------|--------------------|---------|------------|
| ADAM ADAMS COUNTY |                      |                    |                                |            |                 |                |           |             |            |                    |         |            |
| 2311              | GRADING              | 1131 miles         | 8 pass mi                      | 100        | 9048            | 12             | 1         | 754         | 134,876    | 193,024            | 0       | 327,900    |
| 2313              | RE-GRAVELING         | 1131 miles         | 5 cu yd                        | 100        | 5655            | 150            | 6         | 226         | 48,039     | 48,256             | 67,860  | 164,155    |
| 2321              | POTHOLE REPAIR       | 648 miles          | 1 ton                          | 100        | 648             | 2              | 2         | 648         | 115,914    | 25,920             | 25,920  | 167,754    |
| 2322              | CRACK SEALING        | 648 miles          | 5 gal                          | 100        | 3240            | 24             | 3         | 405         | 72,446     | 21,600             | 28,215  | 122,261    |
| 2323              | BLADE PATCHING       | 648 miles          | 1 ton                          | 100        | 648             | 75             | 10        | 86          | 16,355     | 12,522             | 46,182  | 75,059     |
| 2324              | SEAL COATING (BST)   | 648 miles          | 0.2 road mi                    | 100        | 130             | 2.5            | 21        | 1088        | 206,852    | 104,429            | 357,420 | 668,701    |
| 2331              | SHOULDER BLADING     | 1296 miles         | 0.4 shld mi                    | 100        | 518             | 4              | 4         | 518         | 105,754    | 69,466             | 0       | 175,220    |
| 2332              | SHOULDER REPAIR      | 1296 miles         | 0.5 cu yd                      | 100        | 648             | 20             | 4         | 130         | 26,438     | 15,552             | 77,760  | 119,750    |
| 2390              | OTHER ROAD MAINT     | 1779 miles         | 1 hours                        | 100        | 1779            | 16             | 2         | 222         | 39,783     | 3,558              | 2,224   | 45,565     |
| 2411              | DITCHING W/GRADER    | 1296 miles         | 0.1 ditch mi                   | 100        | 130             | 3              | 4         | 173         | 35,251     | 23,155             | 0       | 58,406     |
| 2412              | DITCHING W/DITCHER   | 1296 miles         | 10 ditch ft                    | 100        | 12960           | 500            | 6         | 155         | 33,003     | 18,855             | 0       | 51,858     |
| 2421              | CULVERT CLEANING     | 2669 each          | 1 culverts                     | 100        | 2669            | 20             | 2         | 267         | 54,468     | 4,272              | 0       | 58,740     |
| 2422              | CULVERT REP/REPL     | 2669 each          | 0.2 lin ft                     | 100        | 534             | 40             | 6         | 80          | 15,611     | 8,512              | 13,433  | 37,556     |
| 2490              | OTHER DRAINAGE MTCE  | 1779 miles         | 1 hours                        | 100        | 1779            | 16             | 2         | 222         | 45,370     | 22,240             | 0       | 67,610     |
| 2511              | BRIDGE/STRUCT MTCE   | 124 each           | 0.5 hours                      | 100        | 62              | 24             | 3         | 8           | 1,526      | 520                | 52      | 2,098      |
| 2512              | BRIDGE/STRUCT REPAIR | 124 each           | 0.3 hours                      | 100        | 37              | 24             | 3         | 5           | 939        | 320                | 32      | 1,291      |
| 2590              | OTHER BRG/STR MAINT  | 124 each           | 0.25 hours                     | 100        | 31              | 24             | 3         | 4           | 763        | 260                | 26      | 1,049      |
| 2641              | SIGN MAINTENANCE     | 45000 each         | 0.02 hours                     | 100        | 900             | 24             | 2         | 75          | 17,184     | 6,000              | 3,000   | 26,184     |
| 2642              | GUARDRAIL REPAIR     | 3240 feet          | 0.5 lin ft                     | 100        | 1620            | 60             | 2         | 54          | 12,372     | 4,320              | 2,700   | 19,392     |
| 2643              | TRAFFIC MARKINGS     | 1944 miles         | 2000 ft                        | 100        | 3888000         | 8400           | 2         | 926         | 212,119    | 74,064             | 92,580  | 378,763    |
| 2660              | SNOW & ICE CONTROL   | 1779 miles         | 2.2 hours                      | 100        | 3914            | 8              | 1         | 489         | 112,086    | 82,186             | 58,704  | 252,976    |
| 2670              | STREET CLEANING      | 1779 miles         | 1.3 hours                      | 100        | 2313            | 32             | 4         | 289         | 55,364     | 31,234             | 0       | 86,598     |
| 2690              | OTHER TRAFFIC MAINT  | 1779 miles         | 0.1 hours                      | 100        | 178             | 16             | 2         | 22          | 5,086      | 1,776              | 444     | 7,306      |
| 2712              | BRUSH CONTROL-MECH   | 1296 miles         | 0.1 shldr mi                   | 100        | 130             | 3              | 3         | 130         | 25,353     | 22,464             | 864     | 48,681     |
| 2713              | BRUSH CONTROL-MANUAL | 1296 miles         | 1 hours                        | 100        | 1296            | 48             | 4         | 108         | 22,032     | 12,960             | 1,350   | 36,342     |
| 2721              | CHEM VEG CONTRL-MECH | 1296 miles         | 0.1 shldr mi                   | 100        | 130             | 12             | 2         | 22          | 4,406      | 3,802              | 1,620   | 9,828      |
| 2722              | CHEM VEG CONTRL-MAN  | 1296 miles         | 0.1 hours                      | 100        | 130             | 16             | 2         | 16          | 3,305      | 2,851              | 648     | 6,804      |
| 2731              | LANDSCAPE MAINT      | 1296 miles         | 1 hours                        | 100        | 1296            | 32             | 4         | 162         | 28,979     | 2,592              | 3,240   | 34,811     |
| 2751              | LITTER CONTROL       | 1296 miles         | 1 hours                        | 100        | 1296            | 16             | 2         | 162         | 28,979     | 2,592              | 1,620   | 33,191     |
| 2761              | SLOPE REPAIR         | 1296 miles         | 0.7 hours                      | 100        | 907             | 32             | 4         | 114         | 23,174     | 15,904             | 0       | 39,078     |
| 2790              | OTHER ROADSIDE MAINT | 1296 miles         | 0.1 hours                      | 100        | 130             | 32             | 4         | 16          | 3,346      | 2,296              | 0       | 5,642      |
| 2910              | MAINTENANCE ADMIN    | 1 year             | 5000 hours                     | 100        | 5000            | 8              | 1         | 625         | 150,000    | 20,000             | 0       | 170,000    |
| TOTALS:           |                      |                    |                                |            |                 |                |           | 8201        | 1,657,173  | 857,502            | 785,894 | 3,300,569  |

***And, from the Work Program and Budget, the details of Labor, Equipment and Materials resource requirements can be documented and analyzed.***

***See samples of Labor, Equipment and Material resource requirements reports below.***

**LABOR REQUIREMENTS REPORT (SUMMARY)**  
**COUNTY ROAD ADMINISTRATION BOARD**  
**Maintenance Management Program**

**Mgmt Unit: ADAMS COUNTY**

| CODE        | ACTIVITY<br>NAME       | PERSON DAYS BY MONTH |       |       |                   |       |       |       |       |       |       |       |       | TOTAL<br>NEED | TOTAL<br>COST |
|-------------|------------------------|----------------------|-------|-------|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|---------------|---------------|
|             |                        | OCT                  | NOV   | DEC   | JAN               | FEB   | MAR   | APR   | MAY   | JUN   | JUL   | AUG   | SEP   |               |               |
| L201        | Maint Worker I         | INVENTORY: 1         |       |       | AVAILABILITY: 90% |       |       |       |       |       |       |       |       |               |               |
|             | PERSON DAYS REQUIRED   | 0                    | 0     | 0     | 0                 | 0     | 0     | 0     | 0     | 4     | 90    | 89.6  | 40.8  | 224.4         | 35904         |
|             | AVG NO STAFF REQUIRED: | 0                    | 0     | 0     | 0                 | 0     | 0     | 0     | 0     | 0.2   | 5     | 4.7   | 2.2   | 1             |               |
| L202        | Maint Worker II        | INVENTORY: 1         |       |       | AVAILABILITY: 90% |       |       |       |       |       |       |       |       |               |               |
|             | PERSON DAYS REQUIRED   | 360                  | 383.3 | 278.5 | 243.7             | 318.9 | 395.5 | 533.9 | 411.7 | 265.5 | 386.8 | 385.7 | 290.4 | 4253.9        | 760937        |
|             | AVG NO STAFF REQUIRED: | 18.2                 | 23.7  | 14.7  | 12.9              | 18.6  | 22    | 28.2  | 21.8  | 13.4  | 21.5  | 20.4  | 15.4  | 19.1          |               |
| L203        | Maint WorkerIII        | INVENTORY: 1         |       |       | AVAILABILITY: 90% |       |       |       |       |       |       |       |       |               |               |
|             | PERSON DAYS REQUIRED   | 83.8                 | 95.3  | 149.2 | 147.4             | 154   | 200.6 | 313.1 | 220.3 | 86.1  | 193.9 | 193.4 | 131.9 | 1969          | 451138        |
|             | AVG NO STAFF REQUIRED: | 4.2                  | 5.9   | 7.9   | 7.8               | 9     | 11.1  | 16.6  | 11.7  | 4.3   | 10.8  | 10.2  | 7     | 8.9           |               |
| L206        | Sign Tech              | INVENTORY: 1         |       |       | AVAILABILITY: 90% |       |       |       |       |       |       |       |       |               |               |
|             | PERSON DAYS REQUIRED   | 11.8                 | 12.4  | 12.4  | 12.2              | 12.8  | 12.8  | 12.8  | 12.8  | 198.2 | 290.4 | 290.4 | 198   | 1077          | 246761        |
|             | AVG NO STAFF REQUIRED: | 0.6                  | 0.8   | 0.7   | 0.6               | 0.7   | 0.7   | 0.7   | 0.7   | 10    | 16.1  | 15.4  | 10.5  | 4.8           |               |
| L209        | Supervisor             | INVENTORY: 1         |       |       | AVAILABILITY: 90% |       |       |       |       |       |       |       |       |               |               |
|             | PERSON DAYS REQUIRED   | 52.8                 | 52.8  | 52.5  | 52.5              | 51.8  | 51.8  | 51.8  | 51.8  | 51.8  | 73.2  | 73.1  | 60.9  | 676.8         | 162432        |
|             | AVG NO STAFF REQUIRED: | 2.7                  | 3.3   | 2.8   | 2.8               | 3     | 2.9   | 2.7   | 2.7   | 2.6   | 4.1   | 3.9   | 3.2   | 3             |               |
| TOTAL COST: |                        |                      |       |       |                   |       |       |       |       |       |       |       |       | 1657172       |               |

**EQUIPMENT REQUIREMENTS REPORT (SUMMARY)**  
**COUNTY ROAD ADMINISTRATION BOARD**  
**Maintenance Management Program**

**Mgmt Unit: ADAMS COUNTY**

| RESOURCE<br>CODE | NAME                | EQUIPMENT HOURS BY MONTH |        |       |        |       |        |        |        |        |        |        | TOTAL<br>NEED | TOTAL<br>COST |
|------------------|---------------------|--------------------------|--------|-------|--------|-------|--------|--------|--------|--------|--------|--------|---------------|---------------|
|                  |                     | OCT                      | NOV    | DEC   | JAN    | FEB   | MAR    | APR    | MAY    | JUN    | JUL    | AUG    | SEP           |               |
| E101             | Grader              | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 80     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 681.6                  | 1280.8 | 301.6 | 301.6  | 603.2 | 677.6  | 1799.2 | 1189.6 | 688    | 87.2   | 87.2   | 87.2          | 7784.8        |
|                  | AVG UNITS REQUIRED: | 4.8                      | 11.1   | 2.2   | 2.2    | 5     | 5.3    | 13.4   | 8.9    | 4.9    | 0.7    | 0.6    | 0.6           | 4.9           |
| E102             | Pickup              | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 80     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 1732.8                 | 2323.2 | 1312  | 1306.4 | 1     | 626.4  | 1792   | 2916   | 2388.8 | 1796   | 1432.8 | 1431.2        | 21396         |
|                  | AVG UNITS REQUIRED: | 12.3                     | 20.2   | 9.8   | 9.7    | 13.4  | 14     | 21.7   | 17.8   | 12.8   | 11.2   | 10.6   | 10            | 13.5          |
| E103             | Dump truck          | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 80     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 356.0                  | 399.2  | 936.8 | 929.6  | 951.2 | 1221.6 | 1149.6 | 268.8  | 274.4  | 964    | 960.8  | 566.4         | 8978.4        |
|                  | AVG UNITS REQUIRED: | 2.5                      | 3.5    | 7     | 6.9    | 7.8   | 9.5    | 8.6    | 2      | 1.9    | 7.5    | 7.1    | 4.2           | 5.7           |
| E104             | Sign Truck          | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 80     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 47.2                   | 49.6   | 49.6  | 48.8   | 51.2  | 51.2   | 51.2   | 51.2   | 792.8  | 1161.6 | 1161.6 | 792           | 4308          |
|                  | AVG UNITS REQUIRED: | 0.3                      | 0.4    | 0.4   | 0.4    | 0.4   | 0.4    | 0.4    | 0.4    | 5.6    | 9.1    | 8.6    | 5.9           | 2.7           |
| E105             | Water truck         | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 80     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 126.4                  | 123.2  | 48.8  | 48.8   | 48    | 122.4  | 122.4  | 48     | 48     | 219.2  | 218.4  | 120.8         | 1294.4        |
|                  | AVG UNITS REQUIRED: | 0.9                      | 1.1    | 0.4   | 0.4    | 0.4   | 1      | 0.9    | 0.4    | 0.3    | 1.7    | 1.6    | 0.9           | 0.8           |
| E106             | Loader              | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 90     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 78.4                   | 74.4   | 0     | 0      | 0     | 74.4   | 74.4   | 22.4   | 21.6   | 192    | 191.2  | 93.6          | 822.4         |
|                  | AVG UNITS REQUIRED: | 0.5                      | 0.6    | 0     | 0      | 0     | 0.5    | 0.5    | 0.1    | 0.1    | 1.3    | 1.3    | 0.6           | 0.5           |
| E107             | Patch truck         | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 90     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 576.0                  | 376    | 509.6 | 376    | 505.6 | 637.6  | 372    | 106.4  | 106.4  | 0      | 0      | 106.4         | 3672          |
|                  | AVG UNITS REQUIRED: | 3.6                      | 2.9    | 3.4   | 2.5    | 3.7   | 4.4    | 2.5    | 0.7    | 0.7    | 0      | 0      | 0.7           | 2.1           |
| E108             | Air compressor      | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 90     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 110.4                  | 110.4  | 110.4 | 110.4  | 106.4 | 106.4  | 106.4  | 106.4  | 106.4  | 0      | 0      | 106.4         | 1080          |
|                  | AVG UNITS REQUIRED: | 0.7                      | 0.9    | 0.7   | 0.7    | 0.8   | 0.7    | 0.7    | 0.7    | 0.7    | 0      | 0      | 0.7           | 0.6           |
| E109             | Distributor         | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 80     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D .0                     | 0      | 0     | 0      | 0     | 0      | 0      | 0      | 16     | 188.8  | 188    | 90.4          | 483.2         |
|                  | AVG UNITS REQUIRED: | 0                        | 0      | 0     | 0      | 0     | 0      | 0      | 0      | 0.1    | 1.5    | 1.4    | 0.7           | 0.3           |
| E110             | Steel Roller        | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 80     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 78.4                   | 74.4   | 0     | 0      | 0     | 74.4   | 74.4   | 0      | 16     | 17.6   | 17.6   | 17.6          | 370.4         |
|                  | AVG UNITS REQUIRED: | 0.6                      | 0.6    | 0     | 0      | 0     | 0.6    | 0.6    | 0      | 0.1    | 0.1    | 0.1    | 0.1           | 0.2           |
| E111             | Plate compactor     | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 80     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D .0                     | 0      | 0     | 0      | 0     | 0      | 0      | 0      | 16     | 17.6   | 17.6   | 17.6          | 68.8          |
|                  | AVG UNITS REQUIRED: | 0                        | 0      | 0     | 0      | 0     | 0      | 0      | 0      | 0.1    | 0.1    | 0.1    | 0.1           | 0             |
| E112             | Broom               | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 90     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 48.0                   | 105.6  | 104.8 | 97.6   | 96.8  | 96.8   | 566.4  | 634.4  | 116.8  | 288.8  | 288    | 190.4         | 2634.4        |
|                  | AVG UNITS REQUIRED: | 0.3                      | 0.8    | 0.7   | 0.6    | 0.7   | 0.7    | 3.7    | 4.2    | 0.7    | 2      | 1.9    | 1.3           | 1.5           |
| E113             | Rub tire roller     | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 90     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D .0                     | 0      | 0     | 0      | 0     | 0      | 0      | 0      | 0      | 171.2  | 170.4  | 72.8          | 414.4         |
|                  | AVG UNITS REQUIRED: | 0                        | 0      | 0     | 0      | 0     | 0      | 0      | 0      | 0      | 1.2    | 1.1    | 0.5           | 0.2           |
| E114             | Excavator           | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 90     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 24.8                   | 25.6   | 3.2   | 3.2    | 26.4  | 71.2   | 48     | 88.8   | 44     | 44     | 44     | 44            | 467.2         |
|                  | AVG UNITS REQUIRED: | 0.2                      | 0.2    | 0     | 0      | 0.2   | 0.5    | 0.3    | 0.6    | 0.3    | 0.3    | 0.3    | 0.3           | 0.3           |
| E116             | Chipper             | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 80     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 51.2                   | 51.2   | 48    | 48     | 44.8  | 44.8   | 45.6   | 45.6   | 45.6   | 45.6   | 45.6   | 45.6          | 561.6         |
|                  | AVG UNITS REQUIRED: | 0.4                      | 0.4    | 0.4   | 0.4    | 0.4   | 0.4    | 0.3    | 0.3    | 0.3    | 0.4    | 0.3    | 0.3           | 0.4           |
| E117             | Chainsaw            | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 80     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 102.4                  | 102.4  | 96    | 96     | 89.6  | 89.6   | 91.2   | 91.2   | 91.2   | 91.2   | 91.2   | 91.2          | 1123.2        |
|                  | AVG UNITS REQUIRED: | 0.7                      | 0.9    | 0.7   | 0.7    | 0.7   | 0.7    | 0.7    | 0.7    | 0.6    | 0.7    | 0.7    | 0.7           | 0.7           |
| E119             | Mower               | INVENTORY:               |        |       | 1      | AVAIL | ABILI  | TY     | 80     |        |        |        |               |               |
|                  | EQUIP HOURS REQUIRE | D 32.0                   | 32     | 29.6  | 29.6   | 27.2  | 27.2   | 28     | 28     | 28     | 28     | 28     | 28            | 345.6         |
|                  |                     |                          |        |       |        |       |        |        |        |        |        |        |               | 10368         |

**MATERIAL/OTHER RESOURCE REQUIREMENTS REPORT (SUMMARY)**  
**COUNTY ROAD ADMINISTRATION BOARD**  
**Maintenance Management Program**

**Mgmt Unit: ADAMS COUNTY**

| CODE  | RESOURCE NAME/UNITS      | MATERIAL/OTHER REQUIREMENTS BY MONTH |      |       |       |       |       |       |      |       |        |        | TOTAL NEED | TOTAL COST |        |
|-------|--------------------------|--------------------------------------|------|-------|-------|-------|-------|-------|------|-------|--------|--------|------------|------------|--------|
|       |                          | OCT                                  | NOV  | DEC   | JAN   | FEB   | MAR   | APR   | MAY  | JUN   | JUL    | AUG    |            |            | SEP    |
| M301  | 5/8" crush rock<br>CY    | 1470                                 | 2815 | 1400  | 1220  | 1220  | 2615  | 1395  | 112  | 108   | 8664   | 8624   | 3744       | 33387      | 400644 |
| M302  | Cold Mix<br>Ton          | 116.4                                | 66.4 | 99.8  | 66.4  | 99.8  | 132.8 | 66.4  | 0    | 0     | 0      | 0      | 0          | 648        | 25920  |
| M303  | Crack filler<br>Gal      | 1380                                 | 1380 | 1380  | 1380  | 1330  | 1330  | 1330  | 1330 | 1330  | 0      | 0      | 1330       | 13500      | 27000  |
| M304  | Sand<br>CY               | 13.8                                 | 13.8 | 13.8  | 13.8  | 13.3  | 13.3  | 13.3  | 13.3 | 13.3  | 0      | 0      | 13.3       | 135        | 1215   |
| M305  | Tack oil<br>Gal          | 0                                    | 0    | 0     | 0     | 0     | 0     | 0     | 0    | 300   | 330    | 330    | 330        | 1290       | 1032   |
| M306  | Hot Mix Class G<br>Ton   | 0                                    | 0    | 0     | 0     | 0     | 0     | 0     | 0    | 300   | 330    | 330    | 330        | 1290       | 45150  |
| M307  | CRS2 or CM<br>Gal        | 0                                    | 0    | 0     | 0     | 0     | 0     | 0     | 0    | 0     | 321000 | 319500 | 136500     | 777000     | 77700  |
| M308  | Culvert<br>Ft            | 0                                    | 0    | 0     | 0     | 0     | 0     | 0     | 112  | 108   | 104    | 104    | 104        | 532        | 6384   |
| M311  | Markers<br>Ea            | 0                                    | 0    | 0     | 0     | 0     | 0     | 0     | 0    | 0     | 128400 | 127800 | 54600      | 310800     | 31080  |
| M391  | Misc materials<br>\$     | 1220                                 | 878  | 12503 | 12497 | 12634 | 13006 | 13408 | 1776 | 1459  | 1458   | 1458   | 1448       | 73745      | 73745  |
| M392  | Misc sign material<br>\$ | 260                                  | 272  | 272   | 272   | 296   | 296   | 296   | 296  | 18836 | 28056  | 28056  | 18816      | 96024      | 96024  |
| TOTAL |                          |                                      |      |       |       |       |       |       |      |       |        |        | COST:      | 785894     |        |

And, more detailed use of resources can be shown by activity.....

**LABOR REQUIREMENTS REPORT (DETAIL)**  
**COUNTY ROAD ADMINISTRATION BOARD**  
**Maintenance Management Program**

| CODE | ACTIVITY NAME                               | PERSON DAYS BY MONTH |       |      |      |                 |       |       |       |      |       |       |       | TOTAL NEED | TOTAL COST |      |
|------|---|----------------------|-------|------|------|-----------------|-------|-------|-------|------|-------|-------|-------|------------|------------|------|
|      |   | OCT                  | NOV   | DEC  | JAN  | FEB             | MAR   | APR   | MAY   | JUN  | JUL   | AUG   | SEP   |            |            |      |
|      |   |                      |       |      |      | Maint Worker I  |       | L201  |       |      |       |       |       |            |            |      |
| 2323 | ADAM - ADAMS COUNTY<br>BLADE PATCHING       | 0                    | 0     | 0    | 0    | 0               | 0     | 0     | 0     | 0    | 4     | 4.4   | 4.4   | 4.4        | 17.2       | 2752 |
| 2324 | ADAM - ADAMS COUNTY<br>SEAL COATING (BST)   | 0                    | 0     | 0    | 0    | 0               | 0     | 0     | 0     | 0    | 85.6  | 85.2  | 36.4  | 207.2      | 33152      |      |
|      | TOTAL:                                      | 0                    | 0     | 0    | 0    | 0               | 0     | 0     | 0     | 4    | 90    | 89.6  | 40.8  | 224.4      | 35904      |      |
|      |   |                      |       |      |      | Maint Worker II |       | L202  |       |      |       |       |       |            |            |      |
| 2311 | ADAM - ADAMS COUNTY<br>GRADING              | 75.4                 | 150.8 | 37.7 | 37.7 | 75.4            | 75.4  | 150.8 | 75.4  | 75.4 | 0     | 0     | 0     | 754        | 134876     |      |
| 2313 | ADAM - ADAMS COUNTY<br>RE-GRAVELING         | 19.6                 | 18.6  | 0    | 0    | 0               | 18.6  | 18.6  | 0     | 0    | 0     | 0     | 0     | 75.4       | 13488      |      |
| 2321 | ADAM - ADAMS COUNTY<br>POTHOLE REPAIR       | 116.4                | 66.4  | 99.8 | 66.4 | 99.8            | 132.8 | 66.4  | 0     | 0    | 0     | 0     | 0     | 648        | 115914     |      |
| 2322 | ADAM - ADAMS COUNTY<br>CRACK SEALING        | 41.4                 | 41.4  | 41.4 | 41.4 | 39.9            | 39.9  | 39.9  | 39.9  | 39.9 | 0     | 0     | 39.9  | 405        | 72446      |      |
| 2323 | ADAM - ADAMS COUNTY<br>BLADE PATCHING       | 0                    | 0     | 0    | 0    | 0               | 0     | 0     | 0     | 10   | 11    | 11    | 11    | 43         | 7692       |      |
| 2324 | ADAM - ADAMS COUNTY<br>SEAL COATING (BST)   | 0                    | 0     | 0    | 0    | 0               | 0     | 0     | 0     | 0    | 235.4 | 234.3 | 100.1 | 569.8      | 101926     |      |
| 2331 | ADAM - ADAMS COUNTY<br>SHOULDER BLADING     | 0                    | 0     | 0    | 0    | 0               | 0     | 129.6 | 129.6 | 0    | 0     | 0     | 0     | 259.2      | 46366      |      |
| 2332 | ADAM - ADAMS COUNTY<br>SHOULDER REPAIR      | 0                    | 14.2  | 14   | 12.2 | 12.2            | 12.2  | 0     | 0     | 0    | 0     | 0     | 0     | 64.8       | 11591      |      |
| 2390 | ADAM - ADAMS COUNTY<br>OTHER ROAD MAINT     | 18.6                 | 18.6  | 19   | 19   | 18.4            | 18.4  | 18.4  | 18.4  | 18.4 | 18.4  | 18.4  | 18.4  | 222.4      | 39783      |      |
| 2411 | ADAM - ADAMS COUNTY<br>DITCHING W/GRADER    | 0                    | 0     | 0    | 0    | 0               | 0     | 0     | 17    | 17.2 | 17.4  | 17.4  | 17.4  | 86.4       | 15455      |      |
| 2412 | ADAM - ADAMS COUNTY<br>DITCHING W/DITCHER   | 0                    | 0     | 0    | 0    | 0               | 0     | 0     | 10.2  | 10.4 | 10.4  | 10.4  | 10.4  | 51.8       | 9266       |      |
| 2421 | ADAM - ADAMS COUNTY<br>CULVERT CLEANING     | 12.5                 | 12.5  | 12.6 | 12.6 | 12.6            | 10.1  | 10.1  | 10.1  | 10.1 | 10.1  | 10.1  | 10.1  | 133.5      | 23880      |      |
| 2422 | ADAM - ADAMS COUNTY<br>CULVERT REP/REPL     | 0                    | 0     | 0    | 0    | 0               | 0     | 0     | 11.2  | 10.8 | 10.4  | 10.4  | 10.4  | 53.2       | 9516       |      |
| 2490 | ADAM - ADAMS COUNTY<br>OTHER DRAINAGE MTCE  | 9.6                  | 9.3   | 9.3  | 9.3  | 9.3             | 9.2   | 9.2   | 9.2   | 9.2  | 9.2   | 9.2   | 9.2   | 111.2      | 19891      |      |
| 2511 | ADAM - ADAMS COUNTY<br>BRIDGE/STRUCT MTCE   | 0                    | 0     | 0    | 0    | 0               | 1     | 1     | 0.6   | 0.6  | 1     | 1     | 0     | 5.2        | 930        |      |
| 2512 | ADAM - ADAMS COUNTY<br>BRIDGE/STRUCT REPAIR | 0                    | 0     | 0    | 0    | 0               | 0     | 0     | 0     | 0.8  | 0.8   | 0.8   | 0.8   | 3.2        | 572        |      |
| 2590 | ADAM - ADAMS COUNTY<br>OTHER BRG/STR MAINT  | 0                    | 0     | 0.4  | 0.4  | 0.4             | 0.2   | 0.2   | 0.2   | 0.2  | 0.2   | 0.2   | 0.2   | 2.6        | 465        |      |
| 2670 | ADAM - ADAMS COUNTY<br>STREET CLEANING      | 18                   | 18.3  | 18.3 | 18.3 | 18              | 18    | 18    | 18    | 18   | 18    | 18    | 18    | 216.9      | 38799      |      |

***To assist in leveling the workload over various months or specific periods of the year, and to assist in identifying resource needs on a month-to-month and annual basis, Work Calendars and Workload Distribution reports are useful.***

***The Work Calendar and Workload Distribution can be used as a baseline for scheduling specific maintenance work activities....often done on a weekly or bi-weekly basis.***

***Samples of a Work Calendar and a Workload Distribution report are shown below.***

**WORK CALENDAR**  
**COUNTY ROAD ADMINISTRATION BOARD**  
**Maintenance Management Program**

| CODE              | ACTIVITY<br>NAME/ANNUAL WORK QTY     | CREW<br>SIZE | CREW DAYS PLANNED |       |      |      |      |      |       |      |      |       |       |      | ANNUAL<br>TOTAL | AVG<br>DAILY<br>PROD |
|-------------------|--------------------------------------|--------------|-------------------|-------|------|------|------|------|-------|------|------|-------|-------|------|-----------------|----------------------|
|                   |                                      |              | OCT               | NOV   | DEC  | JAN  | FEB  | MAR  | APR   | MAY  | JUN  | JUL   | AUG   | SEP  |                 |                      |
| ADAM ADAMS COUNTY |                                      |              |                   |       |      |      |      |      |       |      |      |       |       |      |                 |                      |
| 2311              | GRADING<br>9048 pass mi              | 1            | 75.4              | 150.8 | 37.7 | 37.7 | 75.4 | 75.4 | 150.8 | 75.4 | 75.4 | 0     | 0     | 0    | 754             | 12                   |
| 2313              | RE-GRAVELING<br>5655 cu yd           | 6            | 9.8               | 9.3   | 0    | 0    | 0    | 9.3  | 9.3   | 0    | 0    | 0     | 0     | 0    | 37.7            | 150                  |
| 2321              | POTHOLE REPAIR<br>648 ton            | 2            | 58.2              | 33.2  | 49.9 | 33.2 | 49.9 | 66.4 | 33.2  | 0    | 0    | 0     | 0     | 0    | 324             | 2                    |
| 2322              | CRACK SEALING<br>3240 gal            | 3            | 13.8              | 13.8  | 13.8 | 13.8 | 13.3 | 13.3 | 13.3  | 13.3 | 13.3 | 0     | 0     | 13.3 | 135             | 24                   |
| 2323              | BLADE PATCHING<br>648 ton            | 10           | 0                 | 0     | 0    | 0    | 0    | 0    | 0     | 0    | 2    | 2.2   | 2.2   | 2.2  | 8.6             | 75                   |
| 2324              | SEAL COATING (BST)<br>130 road mi    | 21           | 0                 | 0     | 0    | 0    | 0    | 0    | 0     | 0    | 0    | 21.4  | 21.3  | 9.1  | 51.8            | 2.5                  |
| 2331              | SHOULDER BLADING<br>518 shld mi      | 4            | 0                 | 0     | 0    | 0    | 0    | 0    | 64.8  | 64.8 | 0    | 0     | 0     | 0    | 129.6           | 4                    |
| 2332              | SHOULDER REPAIR<br>648 cu yd         | 4            | 0                 | 7.1   | 7    | 6.1  | 6.1  | 6.1  | 0     | 0    | 0    | 0     | 0     | 0    | 32.4            | 20                   |
| 2390              | OTHER ROAD MAINT<br>1779 hours       | 2            | 9.3               | 9.3   | 9.5  | 9.5  | 9.2  | 9.2  | 9.2   | 9.2  | 9.2  | 9.2   | 9.2   | 9.2  | 111.2           | 16                   |
| 2411              | DITCHING W/GRADER<br>130 ditch mi    | 4            | 0                 | 0     | 0    | 0    | 0    | 0    | 0     | 8.5  | 8.6  | 8.7   | 8.7   | 8.7  | 43.2            | 3                    |
| 2412              | DITCHING W/DITCHER<br>12960 ditch ft | 6            | 0                 | 0     | 0    | 0    | 0    | 0    | 0     | 5.1  | 5.2  | 5.2   | 5.2   | 5.2  | 25.9            | 500                  |
| 2421              | CULVERT CLEANING<br>2669 culverts    | 2            | 12.5              | 12.5  | 12.6 | 12.6 | 12.6 | 10.1 | 10.1  | 10.1 | 10.1 | 10.1  | 10.1  | 10.1 | 133.5           | 20                   |
| 2422              | CULVERT REP/REPL<br>534 lin ft       | 6            | 0                 | 0     | 0    | 0    | 0    | 0    | 0     | 2.8  | 2.7  | 2.6   | 2.6   | 2.6  | 13.3            | 40                   |
| 2490              | OTHER DRAINAGE MTCE<br>1779 hours    | 2            | 9.6               | 9.3   | 9.3  | 9.3  | 9.3  | 9.2  | 9.2   | 9.2  | 9.2  | 9.2   | 9.2   | 9.2  | 111.2           | 16                   |
| 2511              | BRIDGE/STRUCT MTCE<br>62 hours       | 3            | 0                 | 0     | 0    | 0    | 0    | 0.5  | 0.5   | 0.3  | 0.3  | 0.5   | 0.5   | 0    | 2.6             | 24                   |
| 2512              | BRIDGE/STRUCT REPAIR<br>37 hours     | 3            | 0                 | 0     | 0    | 0    | 0    | 0    | 0     | 0    | 0.4  | 0.4   | 0.4   | 0.4  | 1.6             | 24                   |
| 2590              | OTHER BRG/STR MAINT<br>31 hours      | 3            | 0                 | 0     | 0.2  | 0.2  | 0.2  | 0.1  | 0.1   | 0.1  | 0.1  | 0.1   | 0.1   | 0.1  | 1.3             | 24                   |
| 2641              | SIGN MAINTENANCE<br>900 hours        | 2            | 2.9               | 3     | 3    | 3    | 3.2  | 3.2  | 3.2   | 3.2  | 3.2  | 3.2   | 3.2   | 3.2  | 37.5            | 24                   |
| 2642              | GUARDRAIL REPAIR<br>1620 lin ft      | 2            | 2.3               | 2.4   | 2.4  | 2.3  | 2.2  | 2.2  | 2.2   | 2.2  | 2.2  | 2.2   | 2.2   | 2.2  | 27              | 60                   |
| 2643              | TRAFFIC MARKINGS<br>3888000 ft       | 2            | 0                 | 0     | 0    | 0    | 0    | 0    | 0     | 0    | 92.7 | 138.8 | 138.8 | 92.6 | 462.9           | 8400                 |
| 2660              | SNOW & ICE CONTROL<br>3914 hours     | 1            | 0                 | 0     | 97.9 | 97.9 | 97.8 | 97.8 | 97.8  | 0    | 0    | 0     | 0     | 0    | 489.2           | 8                    |
| 2670              | STREET CLEANING<br>2313 hours        | 4            | 6                 | 6.1   | 6.1  | 6.1  | 6    | 6    | 6     | 6    | 6    | 6     | 6     | 6    | 72.3            | 32                   |
| 2690              | OTHER TRAFFIC MAINT<br>178 hours     | 2            | 0.7               | 0.8   | 0.8  | 0.8  | 1    | 1    | 1     | 1    | 1    | 1     | 1     | 1    | 11.1            | 16                   |
| 2712              | BRUSH CONTROL-MECH<br>130 shldr mi   | 3            | 4                 | 4     | 3.7  | 3.7  | 3.4  | 3.4  | 3.5   | 3.5  | 3.5  | 3.5   | 3.5   | 3.5  | 43.2            | 3                    |
| 2713              | BRUSH CONTROL-MANUAL<br>1296 hours   | 4            | 2.4               | 2.4   | 2.3  | 2.3  | 2.2  | 2.2  | 2.2   | 2.2  | 2.2  | 2.2   | 2.2   | 2.2  | 27              | 48                   |
| 2721              | CHEM VEG CONTRL-MECH<br>130 shldr mi | 2            | 0.8               | 0.8   | 0    | 0    | 0.8  | 1.2  | 1.2   | 1.2  | 1.2  | 1.2   | 1.2   | 1.2  | 10.8            | 12                   |
| 2722              | CHEM VEG CONTRL-MAN<br>130 hours     | 2            | 0.7               | 0     | 0    | 0    | 0.7  | 0.7  | 1.5   | 0.9  | 0.9  | 0.9   | 0.9   | 0.9  | 8.1             | 16                   |
| 2731              | LANDSCAPE MAINT<br>1296 hours        | 4            | 3.7               | 0     | 0    | 0    | 0    | 3.8  | 8     | 8.2  | 4.2  | 4.2   | 4.2   | 4.2  | 40.5            | 32                   |
| 2751              | LITTER CONTROL<br>1296 hours         | 2            | 6.6               | 6.6   | 6.6  | 6.8  | 6.8  | 6.8  | 6.8   | 6.8  | 6.8  | 6.8   | 6.8   | 6.8  | 81              | 16                   |
| 2761              | SLOPE REPAIR<br>907 hours            | 4            | 2.7               | 2.8   | 0    | 0    | 2.9  | 8.6  | 5.7   | 5.7  | 0    | 0     | 0     | 0    | 28.4            | 32                   |
| 2790              | OTHER ROADSIDE MAINT<br>130 hours    | 4            | 0.4               | 0.4   | 0.4  | 0.4  | 0.4  | 0.3  | 0.3   | 0.3  | 0.3  | 0.3   | 0.3   | 0.3  | 4.1             | 32                   |
| 2910              | MAINTENANCE ADMIN<br>5000 hours      | 1            | 52.8              | 52.8  | 52.5 | 52.5 | 51.8 | 51.8 | 51.8  | 51.8 | 51.8 | 51.8  | 51.8  | 51.8 | 625             | 8                    |

**WORKLOAD DISTRIBUTION REPORT**  
**COUNTY ROAD ADMINISTRATION BOARD**  
**Maintenance Management Program**

| ACTIVITY<br>CODE        | NAME                 | Person Days Per Month |     |     |     |     |     |     |     |     |      |      |     | TOTAL | CREW<br>SIZE | CREW<br>DAYS |
|-------------------------|----------------------|-----------------------|-----|-----|-----|-----|-----|-----|-----|-----|------|------|-----|-------|--------------|--------------|
|                         |                      | OCT                   | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL  | AUG  | SEP |       |              |              |
| ADAM ADAMS COUNTY       |                      |                       |     |     |     |     |     |     |     |     |      |      |     |       |              |              |
| 2311                    | GRADING              | 75                    | 151 | 38  | 38  | 75  | 75  | 151 | 75  | 75  |      |      |     | 754   | 1            | 754          |
| 2313                    | RE-GRAVELING         | 59                    | 56  |     |     |     | 56  | 56  |     |     |      |      |     | 226   | 6            | 38           |
| 2321                    | POTHOLE REPAIR       | 116                   | 66  | 100 | 66  | 100 | 133 | 66  |     |     |      |      |     | 648   | 2            | 324          |
| 2322                    | CRACK SEALING        | 41                    | 41  | 41  | 41  | 40  | 40  | 40  | 40  | 40  |      |      | 40  | 405   | 3            | 135          |
| 2323                    | BLADE PATCHING       |                       |     |     |     |     |     |     |     | 20  | 22   | 22   | 22  | 86    | 10           | 9            |
| 2324                    | SEAL COATING (BST)   |                       |     |     |     |     |     |     |     |     | 449  | 447  | 191 | 1088  | 21           | 52           |
| 2331                    | SHOULDER BLADING     |                       |     |     |     |     |     | 259 | 259 |     |      |      |     | 518   | 4            | 130          |
| 2332                    | SHOULDER REPAIR      |                       | 28  | 28  | 24  | 24  | 24  |     |     |     |      |      |     | 130   | 4            | 32           |
| 2390                    | OTHER ROAD MAINT     | 19                    | 19  | 19  | 19  | 18  | 18  | 18  | 18  | 18  | 18   | 18   | 18  | 222   | 2            | 111          |
| 2411                    | DITCHING W/GRADER    |                       |     |     |     |     |     | 34  | 34  | 35  | 35   | 35   | 35  | 173   | 4            | 43           |
| 2412                    | DITCHING W/DITCHER   |                       |     |     |     |     |     | 31  | 31  | 31  | 31   | 31   | 31  | 155   | 6            | 26           |
| 2421                    | CULVERT CLEANING     | 25                    | 25  | 25  | 25  | 25  | 20  | 20  | 20  | 20  | 20   | 20   | 20  | 267   | 2            | 134          |
| 2422                    | CULVERT REP/REPL     |                       |     |     |     |     |     | 17  | 16  | 16  | 16   | 16   | 16  | 80    | 6            | 13           |
| 2490                    | OTHER DRAINAGE MTCE  | 19                    | 19  | 19  | 19  | 19  | 18  | 18  | 18  | 18  | 18   | 18   | 18  | 222   | 2            | 111          |
| 2511                    | BRIDGE/STRUCT MTCE   |                       |     |     |     |     | 2   | 2   | 1   | 1   | 2    | 2    |     | 8     | 3            | 3            |
| 2512                    | BRIDGE/STRUCT REPAIR |                       |     |     |     |     |     |     |     | 1   | 1    | 1    | 1   | 5     | 3            | 2            |
| 2590                    | OTHER BRG/STR MAINT  |                       |     | 1   | 1   | 1   | 0   | 0   | 0   | 0   | 0    | 0    | 0   | 4     | 3            | 1            |
| 2641                    | SIGN MAINTENANCE     | 6                     | 6   | 6   | 6   | 6   | 6   | 6   | 6   | 6   | 6    | 6    | 6   | 75    | 2            | 38           |
| 2642                    | GUARDRAIL REPAIR     | 5                     | 5   | 5   | 5   | 4   | 4   | 4   | 4   | 4   | 4    | 4    | 4   | 54    | 2            | 27           |
| 2643                    | TRAFFIC MARKINGS     |                       |     |     |     |     |     |     |     | 185 | 278  | 278  | 185 | 926   | 2            | 463          |
| 2660                    | SNOW & ICE CONTROL   |                       |     | 98  | 98  | 98  | 98  | 98  |     |     |      |      |     | 489   | 1            | 489          |
| 2670                    | STREET CLEANING      | 24                    | 24  | 24  | 24  | 24  | 24  | 24  | 24  | 24  | 24   | 24   | 24  | 289   | 4            | 72           |
| 2690                    | OTHER TRAFFIC MAINT  | 1                     | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2   | 2    | 2    | 2   | 22    | 2            | 11           |
| 2712                    | BRUSH CONTROL-MECH   | 12                    | 12  | 11  | 11  | 10  | 10  | 11  | 11  | 11  | 11   | 11   | 11  | 130   | 3            | 43           |
| 2713                    | BRUSH CONTROL-MANUAL | 10                    | 10  | 9   | 9   | 9   | 9   | 9   | 9   | 9   | 9    | 9    | 9   | 108   | 4            | 27           |
| 2721                    | CHEM VEG CONTRL-MECH | 2                     | 2   |     |     | 2   | 2   | 2   | 2   | 2   | 2    | 2    | 2   | 22    | 2            | 11           |
| 2722                    | CHEM VEG CONTRL-MAN  | 1                     |     |     |     | 1   | 1   | 3   | 2   | 2   | 2    | 2    | 2   | 16    | 2            | 8            |
| 2731                    | LANDSCAPE MAINT      | 15                    |     |     |     |     | 15  | 32  | 33  | 17  | 17   | 17   | 17  | 162   | 4            | 41           |
| 2751                    | LITTER CONTROL       | 13                    | 13  | 13  | 14  | 14  | 14  | 14  | 14  | 14  | 14   | 14   | 14  | 162   | 2            | 81           |
| 2761                    | SLOPE REPAIR         | 11                    | 11  |     |     | 12  | 34  | 23  | 23  |     |      |      |     | 114   | 4            | 28           |
| 2790                    | OTHER ROADSIDE MAINT | 2                     | 2   | 2   | 2   | 2   | 1   | 1   | 1   | 1   | 1    | 1    | 1   | 16    | 4            | 4            |
| 2910                    | MAINTENANCE ADMIN    | 53                    | 53  | 53  | 53  | 52  | 52  | 52  | 52  | 52  | 52   | 52   | 52  | 625   | 1            | 625          |
| TOTAL PERSON DAYS:      |                      | 508                   | 544 | 493 | 456 | 538 | 661 | 912 | 697 | 606 | 1034 | 1032 | 722 | 8201  |              |              |
| WORK DAYS/MONTH/PERSON: |                      | 22                    | 18  | 21  | 21  | 19  | 20  | 21  | 21  | 22  | 20   | 21   | 21  |       |              |              |
| ESTIMATED STAFF NEEDED: |                      | 23                    | 30  | 24  | 22  | 28  | 33  | 43  | 33  | 28  | 52   | 49   | 34  | 33    |              |              |